

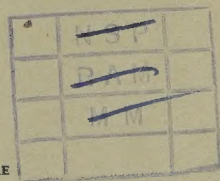


STATE OF SINGAPORE

# ANNUAL REPORT OF THE BOTANIC GARDENS DEPARTMENT FOR 1958

PRINTED BY A. G. BANFIELD, GOVERNMENT PRINTER, SINGAPORE  
1960

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# ANNUAL REPORT OF THE BOTANIC GARDENS DEPARTMENT FOR 1958

BY

H. M. BURKILL

*Director, Botanic Gardens  
Singapore*

PRINTED BY A. G. BANFIELD, GOVERNMENT PRINTER, SINGAPORE

1960





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## ADMINISTRATION

### I. STAFF

THE EXTREMELY difficult staff position recorded for 1957 remained little relieved in 1958 and shortages still threw an undue burden on available personnel and greatly limited the activity of the Department.

2. It is with regret that the deaths are recorded of two faithful long service members of the Department during 1958. Haji Mohamed Nur bin Mohamed Ghous, B.E.M., re-engaged pensioner, Herbarium and Museum Assistant, died on the 8th November at the age of 60 years. He had served the Department since 1st January, 1913 and for his outstanding ability and faithful service was awarded the British Empire Medal in 1955. 'Che Ngadiman bin Haji Ismail, pensioner, lately Head Ranger, Nature Reserves, died at the age of 54 years on 24th September, eight months after his retirement. He has served the Department since 1st January, 1921.

3. The post of Assistant Director was vacant throughout the year. Local and overseas advertisement produced no response. The post of Librarian, vacant January to March, was filled on 1st April by the appointment of Mr. Tan Kim Ho. The post of Herbarium and Museum Assistant fell vacant on 8th November on the death of Haji Mohamed Nur bin Mohamed Ghous. 'Che Mohamed Shah acted in the vacancy for the rest of the year, and was later confirmed in the post.

4. Three officers, Botanist, Horticultural Assistant and Laboratory Assistant were absent on training awards in England, the first two for the whole year, the third for 11 months. For details see paragraph 9. Dr. Furtado, Government pensioner, lately Botanist of this Department, was retained as a training replacement officer in the post of Botanist.

5. The Director was on long delayed overseas leave from 5th April to 2nd November inclusive. During this period Mr. Addison, Curator, acted as Director.

6. The Director was Acting Agricultural Officer, Singapore, in addition to his other duties, from 1st to 10th January.

7. Of the administrative staff, the post of Higher Clerical Officer was upgraded to that of Executive Officer in the newly created Executive Service. There was no change in personnel in the office and the duties of the new post of Executive Officer, which remained vacant throughout the year, were carried out by the person holding the junior post of Higher Clerical Officer of the previous year's establishment.

### II. LABOUR

8. The labour force averaged 72 men, women and juveniles at the Gardens, four in the herbarium, 55 in the Government House Domain and 9 in the Nature Reserves.

### III. TRAINING

9. Under the Government's policy of training personnel, three officers were away overseas.

(i) Mr. Chew Wee Lek, Botanist, continued to study at Cambridge University, England, for a post-graduate degree, under Mr. Corner, who was Assistant Director, Botanic Gardens, Singapore, and who retired in 1946.

- (ii) Mr. Lam Hin Cheng, Horticultural Assistant, continued to study at the Royal Botanic Gardens, Kew, for the Kew Diploma.
- (iii) Mr. Bajuri bin Sappan, Laboratory Assistant, was sent to England on 24th January to follow a course of study on plant breeding and propagation. He studied at the John Innes Horticultural Institution, Bayfordbury, Dorset Nurseries, Poole, and the Royal Botanic Gardens, Kew.

10. Arrangements were made for Mr. Tan Kim Ho, Librarian, to go to Australia to study library management under a Colombo Aid grant given by the Australian Government.

#### IV. BOTANIC GARDENS ORDINANCE

11. Under section 3 (3) of the Botanic Gardens Ordinance, 1957 (No. 32 of 1957), the following officers of the Botanic Gardens were gazetted with the powers of a police officer within the Gardens [G.N. 1867 of the *Government Gazette*, Vol. 13 (78), 15th August, 1958]:

- (i) Director,
- (ii) Assistant Director,
- (iii) Curator,
- (iv) Watchmen.

By-laws were enacted under the title of the Botanic Gardens Rules, 1958, in the *Government Gazette* Supplement No. 52 of 15th August, 1958, No. S 182, See Appendix VII.

#### V. BUILDINGS AND ROADS

12. The Director's quarters underwent an extensive overhaul by the Public Works Department, Singapore; several timbers suffering from dry rot were replaced. This house, built in 1866, still has much of the original wood-work which is in excellent condition.

13. Repairs were carried out by the Public Works Department to the plant house on Lawn L. The main part of the house was enclosed with expanded metal, replacing the wire netting, to improve security. The overhead slats of the quadrangle surround were renewed and placed more widely than before to permit the trusses of *Mucuna* grown on this erection to hang through, thus being visible from below.

14. The Public Works Department also resurfaced the Upper Ring Road, Main Gate Road, a part of Ljane Road and the drive to the Curator's quarters at 30 Cluny Road. Repairs were done to the road leading to the quarters of the Keeper of the Herbarium and to the Labourers' lines.

15. By Gardens' resources, the lily pond on Lawn L was completed and two plant houses at the potting yard were renovated. To accommodate the expanding quantity of orchid seedlings, another house was built in the enclosure and also a slatted-roof house for the more mature seedlings. Near the end of the year, it was decided to move all the orchid species collection from the "bear pits" near the Director's Quarters into the enclosure and work was begun to make another slatted-roof house for their concentration. The perimeter fence of the Gardens was also repaired.

#### VI. VISITORS

16. As usual a large number of official visitors called at the office, amongst them being Mr. E. Melville, Colonial Office; Sir Harry Jephcott, Chairman and Managing Director of Glaxo Laboratories, London; Professor



J. E. Spenser, University of California; Mr. G. Seidenfaden, Danish Ambassador to Thailand; Mrs. S. Sahni, Honorary Director Birbal Sahni Institute of Palaeobotany, Lucknow; Professor Monro Fox, F.R.S., Emeritus Professor of Zoology, London University; Dr. Salim Ali, President, Natural History Society of Bombay; and many others.

17. Many visiting research workers were afforded facilities for studying in the Herbarium and Gardens; Dr. R. E. Holttum, retired Director of this Department; Mr. D. P. Nicholson, Forest Department, North Borneo; Dr. J. S. Womersley, Department of Forest, New Guinea; Mr. E. J. H. Corner, Botany School, Cambridge; Mr. Patrick Ping Sam, Forest Ranger, Forest Department, North Borneo; Mr. J. Wyatt-Smith, Forest Research Institute, Kepong; Dr. J. L. Gressitt, Entomologist, Bishop Museum, Honolulu; Professor H. B. Gilliland, Mr. I. Enoch and other lecturers and graduate and undergraduate members of the Botany Department of the University of Malaya.

18. As always the Gardens were frequented by very many casual visitors, both local residents and from elsewhere. Many arrived from far afield in the Federation by chartered bus. The Gardens figured high in the attractions offered to tourists from overseas. The arrival of pleasure cruise ships was always marked by a great influx of visitors for whom, when prior notice was given by the travel agents, special traffic arrangements were made. The lesser gregariousness of cargo ship and air travel however does not pass unnoticed and any day of the week persons obviously from other countries come to the Gardens.

## VII. BAND CONCERTS

19. During the year there were 11 band performances, given by the following regimental bands: 1 King's Own Scottish Borderers; 2 King Edward's Own Gurkha Rifles; 3 Royal Australian Regiment; 2/6 Gurkha Rifles; 2/10 Gurkha Rifles, 1 King's Dragoon Guards (twice); 1 Cheshire (three times); and 1 Foresters. The Commanding Officers of these regiments and the General Officer Commanding Singapore Base District are thanked for their courtesy in permitting these bands to play.

## VIII. PUBLICATIONS

20. One volume of the *Gardens' Bulletin*, Vol. 16, and Part I of Vol. 17, were published during the year.

21. The preparation of Supplement I to *Malayan Orchid Hybrids* was far advanced during the year.

22. The following articles by members of the staff were published during the year:

Anonymous (G. H. ADDISON): Descriptions of New Malayan Hybrids. *Mal. Orchid Rev.* 5 (2), 5 (3), 1958.

BURKILL, H. M.: A Report on R.R.I.M. Large-scale variety Trials of HEVEA BRASILIENSIS Muell-Arg. on Malayan Estates, 1934-1953, 1. *Res. Arch. Rubb. Res. Inst. Malaya Doc.* 10 (1) 1958.

FURTADO, C. X.: When was *Gymnacranthera* Warb. validly published? *Taxon* 7 (5), 1958.

SINCLAIR, J.: A Revision of the Malayan Myristicaceae, *Gard. Bull. Sing.* 16, 1958.

Ararocarpus—A Monstrosity. *Gard. Bull. Sing.* 17 (1), 1958.

Florae Malesianae Precursores—XX. The Genus *Gymnacranthera* (Myristicaceae) in Malaya. *Gard. Bull. Sing.* 17 (1) 1958.

The Flora of Cox's Bazaar, East Pakistan. *Bull. Bot. Soc. Beng.* 9 (2) 1955.

## IX. LIBRARY

23. The accommodation of the library remained unchanged, the books being stored in two separate rooms neither of which was designed for this function, and both badly needed for their intended purposes. One is an office room; the other is an extension of the herbarium in which the spirit collection of plants should be stored. The lack of proper library accommodation is most unsatisfactory as it impedes the proper functioning of the library and holds up other work.

24. Library accessions included 19 books purchased, 25 periodicals on subscription, 154 copies of reprints and 268 periodicals received on reciprocal exchange from 199 institutions. This large intake of material also adds to the embarrassment of improper and inadequate library accommodation.

## X. CONFERENCES

25. Mr. H. M. Burkill, Director, attended the XV International Horticultural Congress held in Nice, France, from the 11th to 18th April as Singapore Government delegate while proceeding to Europe on overseas leave. Mr. Lam Hin Cheng, Horticultural Assistant, who was at that time on a training award in the United Kingdom, also attended the Congress.

26. The Third International Seaweed Symposium was held at Galway, Eire, from 13th to 19th August and was attended by Mr. Burkill during his overseas leave.

27. The University of Malaya staged a Centenary Conference from 2nd to 10th December to mark the 100th anniversary of the work of Wallace, much of which was actually done in Malaya, and the 200th anniversary of the publication of Linnaeus's *Systema Naturae*. Mr. H. M. Burkill, Director, and Mr. J. Sinclair, Keeper of the Herbarium, attended the conference.

## XI. PLANT PROTECTION SERVICE AND AGRICULTURAL PESTS SUPERVISORY COMMITTEE

28. As reported in the last Annual Report, the regional scheme was abandoned in view of the decision of the Borneo territories not to come into such an arrangement. The alternative Pan-Malayan scheme could not be implemented as a result of the decision of the Federation of Malaya Government to organise an entirely independent service in 1958. Plant introduction arrangements for Singapore thus remain as here-to-fore.

29. Mr. Burkill, Director, was a member of the Agricultural Pests Supervisory Committee during the year, and was Chairman 1st-10th January.

## XII. IMPERIAL WAR GRAVES COMMISSION CEMETERY, KRANJI

30. The Botanic Gardens continued to supervise the horticultural work of the Cemetery under instructions from the Imperial War Graves Commission Regional Headquarters in New Delhi. Funds for personnel and materials for this work were provided by the Commission in whose reports fuller detail may be found.

31. The number of visitors to the Cemetery has been estimated at about 10,600 during the year.



### XIII. NATURE RESERVES

32. The Board of Trustees consisted of:

|                                                                   |                           |                                          |
|-------------------------------------------------------------------|---------------------------|------------------------------------------|
| Nominated by the Governor-in-Council                              | 1. Mr. E. Galistan        |                                          |
|                                                                   | 2. Mr. Yusof bin Ishak    | 1/1 to 3/2/58.                           |
|                                                                   | Mr. Morgan Khoo           |                                          |
|                                                                   | Kay Ann                   | .. from 4/2/58.                          |
| Nominated by the Minister for Local Government, Lands and Housing | .. 3. Mr. Tan Hoon Siang  |                                          |
|                                                                   | 4. Prof. H. B. Gilliland  |                                          |
| Nominated by City Council                                         | .. 5. Mr. N. Karupiah     | .. from 9/1/58.                          |
| Nominated by the Rural Board                                      | .. 6. Mr. A. L. B. Swaine | 1/1 to 24/5/58.                          |
|                                                                   | Mr. R. S. Boswell         | .. from 25/9/58.                         |
| Chairman ( <i>ex-officio</i> )                                    | .. 7. Mr. H. M. Burkill   | .. (on leave of absence 5/4 to 2/11/58). |
|                                                                   | Mr. G. H. Addison         | 5/4 to 2/11/58.                          |

33. Mr. Swaine's retirement from Singapore, and hence from the Board, was the Board's major loss during the year. Mr. Swaine had been a trustee since the formation of the Board on 29th June, 1951 and has had a life-long interest in natural history and wild life.

34. The trustees held two meetings during the year.

35. After due consideration the Legislative Assembly amended the Schedule to the Nature Reserve Ordinance to limit the Pandan Nature Reserve to 542 acres. The land on both sides of the Jurong River estuary now remains under the Board's control.

36. Maintenance work in the other three Reserves has gone on normally, much attention being given, as previously, to Bukit Timah.

37. Three rangers and nine labourers were on the Board's pay-roll throughout the year. The Head Ranger, on medical (T.B.) leave since 1956, was invalidated out of service and died a few months later. 'Che Hamzah, Ranger, was promoted Head Ranger with effect from 1st October, and the vacancy of Ranger thus created was filled.

38. The Public Works Department has applied to the Nature Reserves Board for an exchange of 2.8 acres of Quarry Reserve for 2.8 acres of Nature Reserve. This application was under consideration.

### XIV. METEOROLOGICAL

39. Observations were continued at the Meteorological Stations at the office and in the orchid enclosure. Records are tabulated in Appendices II and III. Rainfall at the office was near the average for the past 44 years. At the orchid enclosure rainfall was 9 inches less and fell on 7 days fewer than at the office. Though the two sites are scarcely half a mile apart this serves to show how localised rainstorms can be.

40. Records were supplied to the Meteorological Department, the University of Malaya, including samples of rain collected for a survey of pH of rainwater, and to interested members of the public. A paint technologist was regularly given information for use in research on paints used locally. Observations on the pH of rainwater will be published in a forthcoming number of the *Gardens' Bulletin*.

### XV. FINANCIAL PROVISION

41. Certain departmental projects had to be shelved as a result of the enforcement of general economy measures.



## BOTANICAL RESEARCH

## XVI. COLLECTING AND NEW RECORDS

42. In addition to much useful and valuable material collected and observations made in single day collecting trips into the Singapore Nature Reserves and countryside and into southern Johore, the major collecting work was carried out during the following expeditions:

|                                                 |    |    |                                                                     |    |           |          |
|-------------------------------------------------|----|----|---------------------------------------------------------------------|----|-----------|----------|
| J. Sinclair                                     | .. | .. | Japan (while on a private visit on casual leave)                    | .. | 13-16/5   | 63 nos.  |
| J. Sinclair                                     | .. | .. | Luzon Island, P.I.                                                  | .. | 21/5-5/7  | 390 nos. |
| J. Sinclair                                     | .. | .. | Selangor, Southern and Central Perak and Cameron Highlands          | .. | 7/10-5/11 | 143 nos. |
| H. M. Burkill                                   | .. | .. | Pulau Satumu and neighbouring islands                               | .. | 15-19/2   | 32 nos.  |
| Md. Shah bin Hj. Mohd. Nur                      |    |    | Sabai Estate, Pahang                                                | .. | 23/1-6/2  | 110 nos. |
| Md. Shah bin Hj. Mohd. Nur and Kadim bin Tassim | .. |    | Trans-Perak Irrigation Scheme Area, Perak, Bota Kiri Forest Reserve |    | 3-19/3    | 104 nos. |
| Md. Shah bin Hj. Mohd. Nur and Kadim bin Tassim | .. |    | Bukit Paloh Estate, Johore                                          | .. | 1-15/4    | 82 nos.  |

43. This opportunity is taken to acknowledge the help given in undertaking this work: thanks are due to Mr. T. Koyama of the University of Tokyo; Mr. D. R. Mendoza and Mr. G. E. Edano of the National Museum, Manila; the Master Attendant, Singapore; the Director of Drainage and Irrigation Department, Federation of Malaya, and his officers connected with the Trans-Perak Irrigation Project; Mr. G. M. Rothwell, Manager of Sabai Estate, Pahang; and Mr. W. M. Young, Manager of Bukit Paloh Estate, Johore.

44. The expeditions made by Mr. Sinclair to the Philippine Islands and into Central Malaya were chiefly to follow up his study of the Malaysian *Myristicaceæ*, but at the same time rewarding general collections were made. In the Philippines, field work was carried out at Antipolo, Province Rizal, at Mount Makiling, Province Laguna, at Sipocot, Province Camarines Sur, in the Bicol National Park botanizing as far as the province border with Province Camarines Norte; and in Province Sorsogon at Irosin, Lake Agangay and on Mount Bulusan, and also on the seashore at Bulusan. Finally a few days were spent at Baguio, Province Benguet, with two excursions up Mount Santo Tomas, one reaching the summit of 7,482 ft. altitude.

45. From this collection and from observations in the field, it is seen that the flora in the Philippines has many species in common with that of North Borneo, especially in regard to ferns, *Urticaceæ*, *Euphorbiaceæ*, *Melastomaceæ*, *Lycopodiaceæ*, *Gunnera macrophylla* and *Equisetum debile*. The mountain province of Benguet had a number of endemics (plants entirely confined to the Philippines), but there was a trace of Formosan elements too. For example, an alder, *Alnus formosana* was collected on Mount Santo Tomas. It was near a public road on the side of the steep mountain and although it is not recorded in Merrill's *Enumeration of the Philippine Flowering Plants* there is no reason to doubt its not being truly native here. The most outstanding feature of the vegetation in Baguio is the forest of Benguet Pine, *Pinus insularis*. This tree is restricted to the mountains of Luzon, Burma and Indo-China. It covers the ridges and slopes of the ranges but has been thinned out a good deal by injudicious cutting.

46. Some of the more interesting and rarer plants of Baguio were: *Lactuca dentata*, *Polygonum nepalense*, *Gynura vidaliana*, *Gnaphalium japonicum*, *Deutzia pulchra*, *Berchemia philippinensis* and *Lilium philippinense*. The latter is a beautiful plant with white trumpet-shaped flowers and grows in the most inaccessible places.

47. The expedition to Central Malaya yielded new records for the country. These were: *Juncus inflexus*, a rush hitherto found only on the mountains of Java but common in Europe. Two clumps were found by the roadside about a mile below the summit of Gunong Batu Brinchang, but there was only one flowering stem. It was at the summit of this mountain that the first Malayan record of a *Juncaceae*, *Juncus prismatocarpus*, was recorded in 1956. On this mountain was also found a Himalayan grass, *Miscanthus* sp., but a specimen has been sent to Kew for checking. In the Gunong Bubu Forest Reserve, Kuala Kangsar, a tree belonging to the Mangosteen family, namely *Mammea malayana* was collected in flower. It is new to science. In the same forest male and female flowers of a much wanted species *Knema retusa* were obtained. King's collector, Kunstler once found this *Knema* in fruit in the Gunong Bubu forest. It has never been collected anywhere since and the main object of the expedition was to go back to this type locality and search for it, because its correct systematic position was not clear. Since Gunong Bubu is about 20 miles long and 5 miles wide and had a small bandit population, the chances of finding it were rather remote. It was therefore a matter of great luck to have found it and to have successfully achieved the mission.

48. Some valuable information was obtained about the flora of the Ipoh limestone which has a vegetation quite different from that of other soils. Among the plants collected on the limestone was *Mallotus petiolatus*. It was common but hitherto, in the herbarium, was represented only from a single gathering. Also two new shrubs, not yet described, were collected. The new road up to the radio station on the summit of Gunong Batu Brinchang has opened up the mountain and as a result a number of interesting plants have now been found there including new records for Malaya. Development of the country and the laying of roads to hitherto inaccessible places will facilitate more exploration and doubtless there are many novelties waiting to be found. This development however carries with it the risk of destruction of natural vegetation. Already the orchid population around the summit of Batu Brinchang is being decimated by visitors who take plants home to the heat of the lowlands where they anon die. The vegetation of such places is worthy of protection, and in particular the rare plants of the mountain forest. Many belong to the Indo-Himalayan regional flora which montane has its southern limit of distribution on the higher mountains of Malaya. This element must have been here for countless centuries undisturbed even by the ice ages of the Pleistocene and the volcanic upheavals which broke up Malaysia into an archipelago.

49. Collections were made at Sabai Estate, Paloh Estate and in the Trans-Perak Irrigation Scheme area to sample the vanishing vegetation. This was a continuation of the work outlined in the last Report.

50. Mr. Burkill continued his observations and collections of marine algae at Raffles Light (Pulau Satumu) and on the neighbouring islands of Senang, Biola and Pawai and on the reef Terumbu Selat Biola. Determination of these and previous collections is proving difficult in the absence of literature and of herbarium material for comparison in Singapore.

## XVII. EXCHANGE AND ACQUISITION

51. 7,129 duplicates were distributed to 24 other botanical institutions of which the most important were the Royal Botanic Gardens, Kew; the Rijksherbarium, Leiden and the Arnold Arboretum, Cambridge, Massachusetts, U.S.A. (See Appendix IV.)

52. 5,877 duplicates were received in exchange from other institutions. These are gratefully acknowledged; principal contributors were the Herbarium Bogoriense, Indonesia; the Forest Departments of Sarawak, Brunei, North Borneo and the Federation of Malaya; the Rijksherbarium, Leiden and the Forest Research Institute, Dehra Dun. The Brunei specimens contained many new records since little collecting has been done in that area. The Bogor collection also provided valuable data on geographical distribution in north-east and south-east Borneo, indicating that many plants hitherto thought confined to Sarawak and North Borneo extend to the south.

## XVIII. TAXONOMY

53. Mr. Sinclair's work on the Malaysian *Myristicaceæ* (Nutmeg family) has been carried on through the year. The work on the genus *Gymnacranthera* was completed and published. Examination of *Knema* was begun and a part prepared in manuscript. While in Japan (see paragraph 42) on leave, visits were made to the herbarium of the Botanical Institute, University of Tokyo; the Institute of Forest Botany, Faculty of Agriculture; the National Science Museum and the Research Institute for Natural Resources in order to examine collections of *Myristicaceæ*. Interesting material from New Guinea and the Pacific Islands was seen. While in the Philippines a few days were spent in the herbarium of the National Museum examining *Myristicaceæ* and *Annonaceæ*. Similarly two days were occupied at the Forest Research Institute, Kepong. Mr. Chew Wee Lek has continued his study of the *Moraceæ* (Fig family) at Cambridge while working for a higher degree. Dr. Furtado has spent much time checking and re-sorting material of *Mæsa*, *Litsea*, *Embelia*, *Grenacheria*, *Uncaria* and *Xanthophyllum*.

54. A great amount of material was received for naming, but with the depletion of the botanical staff and the ill-health and eventual death of Haji Mohamed Nur bin Mohamed Ghous, Herbarium Assistant, whose amazing knowledge of Malayan plants was of unique help in making preliminary determinations, this work has been delayed. The largest collection named during the year was from the Forest Department of Sarawak and Brunei. This consisted of 1,942 specimens. Almost as large numbers of specimens were named as the Department's contribution to the Phyto-Chemical Survey of the Malayan flora.

55. Mr. Burkill, while on leave in England spent some time in examining collections of Malaysian marine algæ at the British Museum, London and at the Kew Herbarium and in naming some of the Malayan collections of the Singapore Herbarium which were sent to England for this purpose.

56. Routine work of poisoning, mounting and laying-in of specimens in the herbarium and of repairing old and damaged sheets went on normally.

57. There is an immense amount of work on the regional flora waiting to be done. Ample facilities exist for visiting research workers and any who could come would be made most welcome, in particular trained botanists from the main research centres of Europe and America on which the knowledge of tropical botany still largely rests. If any could work here on an *ad hoc* problem or on general lines the gain would be mutual and to the common good.



## XIX. LOANS OF HERBARIUM MATERIAL

58. A total of 2,886 sheets of specimens was sent out on loan for study during the year to eight institutions. The majority were sent to Leiden and Kew and the principal families or genera supplied were: *Ericaceæ*, *Eriocaulonaceæ*, *Thymeliaceæ*, *Cælostegia*, *Neesia*, *Cyclea*, *Kopsia*, *Rauwolfia*, *Lygodium*, *Schizæa* and in the algae, *Sargassum* and *Codium*.

59. Six institutions sent on loan 3,182 sheets of *Myristicaceæ*.

## HORTICULTURE

### XX. GARDENS MAINTENANCE

60. The Gardens were well maintained, and have been looking their best for many years. The lawns were kept clean and tidy.

61. A number of new beds was dug and large scale planting of herbaceous and annual plants carried out. There were over 70 new permanent plantings. 680 plant labels were made or renewed. Among the notable horticultural acquisitions from overseas which were established were *Lagerstræmia lanceolata*, *Eucalyptus triantha*, *E. microcarys*, *Euphorbia caracasana* var. *sanguinea*, and an interesting collection of bougainvillea hybrids, B. Lady Mary Baring, B. Mary Palmer, B. Isabel Greensmith and B. Gillian Greensmith. These latter were obtained as a result of a private visit by the Director to East Africa. The cultivation and hybridising of bougainvillea has been specially successful in Kenya where these hybrids have been raised with spectacular results. Cuttings were supplied by the courtesy of Mr. H. P. Greensmith, Superintendent, Nairobi City Parks.

62. Twenty-two plants died or were cut down, among the important ones were *Eucalyptus naudiniana*, *Sabal blackburniana*, *Petrea arborea*, *Lodoicea sechellarum*, *Albizzia ealænsis* and *Araucaria excelsa*.

63. Routine manuring, especially with compost and sterameal, was carried out on a number of permanent plants. In addition rock phosphate was used. Most of the aroids and ferns in the Plant House were fed with ammonium sulphate. As an experiment a cover crop *Indigofera endecaphylla* was grown round the base of a number of palm trees. Apart from shading the soil and the exposed adventitious roots, it allows a return to the soil in the form of compost.

64. The frangipanni collection on Lawn J was pruned and the beds manured. The canna beds along the Main Gate Road were re-newed twice during the year. Members of the cycas family which were scattered about the Gardens were duplicated and planted on Lawn D near the office as a collection. The intention is to confine this small but important genus to one area.

65. Some of the Gardens' trees were a source of danger to traffic along Cluny Road and had to be cut down or pruned.

66. Both the ginger-wort rockery and the dell rockery were repaired and replanted.

67. There was a big increase in the number of pot plants under cultivation. Late in the year 400 pots of foliage plants were prepared for the 1959 Constitution Exposition. Newly introduced crotons, roses, dahlias, anthuriums, chrysanthemums and gladioli were established.

68. Owing to the increasing demands of the orchid breeding programme, beds of newly introduced plants in the Orchid Enclosure were cleared and the material transferred to the nursery on Lawn Y.

## XXI. PESTS AND DISEASES

69. The long tailed macaque monkeys in the Gardens remain the major pest. Six were shot. The services of two separate trappers, both doing big business in trapping monkeys in the Federation of Malaya for export for medical research, were enlisted, with barely any success. One caught six monkeys only, the other one. This failure is as depressing as it is interesting for these trappers catch the same species of monkey (*Macaca irus*) with conspicuous success in the forests of the Federation by exactly the same methods they tried in the Gardens. One must comment that the monkeys of the forest would seem to suffer the misfortune of a certain rustic simplicity through which they fall victim of the ruses of the ruthless trapper. And on the other hand the Gardens' monkeys raised in daily contact with their human cousins have acquired an urbanity and a protective sharpness of wit, and a familiarity and contempt for human wiles which would have done credit to many a Dickens character. There would appear to be a similar problem in the Lake Gardens of Kuala Lumpur and is one which could develop elsewhere wherever feeding by the public displaces or amplifies an inadequate source of natural food.

70. Continuous spraying of insecticides and fungicides has helped to check fungal diseases and insect pests. Certainly too the drier weather has limited epidemic conditions for fungal diseases and has thereby limited fungicide trials. The trouble with *Helminthosporium oryzae* experienced in 1957 (see Annual Report 1957, paragraph 70) has recurred but only to a mild degree. Some damage to palms by the rhinoceros beetle (*Oryctes rhinoceros*) and the red stripe weevil *Rhynchophorus ferruginea* var. *schach*) continues. Compost heap breeding sites of the former are regularly examined and the grubs removed, but an appreciable infection must come from outside the Gardens. With the clearing of the countryside for housing projects no control is exercised over the disposal of coconut timber, which remains a source of infection.

## XXII. GOVERNMENT HOUSE DOMAIN

71. The grounds were kept in good condition throughout the year. The mechanical equipment did sterling work, particularly the Hayter rotor scythe which is found to be a very versatile machine.

72. The gardens in front of Government House, the Chief Secretary's House and the Attorney-General's House were given special attention. All borders, shrubs and young trees were fed with compost and sterameal once or twice during the year or even a third time according to requirements. The shrubs of *Stenolobium stans* require liberal manuring and always repaid this extra attention. The canna beds were replanted twice and the orchid bed near the office was mulched regularly every 2-3 months. At House No. 3, occupied by the Permanent Secretary to the Ministers, the tennis court was top-dressed and brought into playing condition. Beds of shrubs and borders in the garden of this house were mulched twice. Government House and other houses in the Domain were kept supplied with flowers and flowering plants.

73. Much of the labour was concentrated on stacking and turning compost heaps. Cattle dung was obtained from the quarantine station, when available, and brewers leys for composting. A regular supply of elephant manure was obtained which is an excellent starter. Experiments were carried out using sawdust in the mixture for composting, but its decay under current methods and requirements is too slow to make it a valuable ingredient.

74. Soil for potting was burnt once a month. It is not feasible to take just any soil as the end-product varies greatly. Soil from below the overseer's quarters has proved to be the best found for sometime, though even this tends to be a little too sandy.

75. The nursery and vegetable garden were maintained, but some of the orchid beds were removed to the potting yard to keep them under closer supervision. The kitchen garden produced vegetables, particularly salad vegetables such as spring onion, parsley, mint, cucumber and lettuce. Corn (*Zea mays*), long beans (*Vigna sinensis*), Lady's fingers (*Hibiscus esculentus*), brinjals (*Solanum melongena*), spinach (*Amaranthus*), Kangkong (*Ipomœa reptans*) and sayor puteh (*Brassica chinensis*) were also grown.

76. The old machine shed behind the Guard Room was pulled down and a new one built near the potting yard. The potting shed was extended by an area of some 300 square feet and a concrete approach made to it so that lorries can be driven to its entrance.

77. The horticultural staff of the Domain competed in the 1958 Singapore Flower Show, winning two first and two third prizes.

78. Monthly visits were paid to Changi cottage and occasionally loads of compost and plants were taken for special occasions. The grass was top dressed with compost and sterameal and all the shrubs received applications of the same fertilizers.

### XXIII. ORCHIDS

79. The plant house on Lawn L in which orchids used to be displayed was enclosed with expanded metal by the Public Works Department. No orchid had been on view to the public there since August 1956 when valuable material was stolen by thieves breaking through the wire netting enclosing the house. This period was as much a loss of pleasure to the public as it was an embarrassment and nuisance to the staff, who had often to deal with disappointed and sometimes testy visitors who felt aggrieved at there being nothing displayed. With the completion of expanded metal walls, orchids in prime bloom along with other choice and interesting plants have been out on display since June. Yet even though a labourer is permanently on duty in the house petty pilfering still takes place. One point will serve to indicate the problem. For long the rapid deterioration of prime orchid blooms soon after they had been placed in the display house had caused perplexity and some annoyance. Eventually it was discovered that private orchid fanciers were removing pollinia from the blooms on display for cross fertilizing their own plants. This emasculation of the flowers led to accelerated withering. Forewarned is forearmed: the labourer is now wise to this sleight of hand.

80. In the orchid enclosure expansion continued at the expense of nursery plants of the plant introduction section which is now in the process of being moved out to the nursery on Lawn Y. Old beds were re-dug, replanted and top dressed with half rotted compost; new beds were made. A problem experienced is the rate at which wooden post rot; and there is many a bed replanted not because the plants were ready for it but because their stakes had collapsed.

81. In Singapore orchid circles, foliar feeding has found great favour, and certain proprietary manures are now well established. In our own work a favourite one has been found to speed up growth initially but after prolonged application a deposit is formed on the leaves which inhibits further growth. It



is still our opinion that orchids need feeding naturally through the roots in part at least, and that probably the best results come from ringing the changes with different manures.

82. Hybridising continued as and when the desired pairs of parents could be obtained in bloom together. In all 214 pollinations were made resulting in 142 successful crosses. Acknowledgment is made of gifts of pods from Mr. H. K. Kuok of Johore Bahru; Mr. Killop of New Guinea; Mr. E. de Saram of Ceylon; Mr. M. Lewis and Mr. A. J. Braga of Singapore and Mr. W. B. Muir of Australia. Their seed and seed from our own crosses were sown in the laboratory.

83. The flask culture using coconut milk with Vacin's formula on an agar base was continued, but in the latter part of the year small quantities of banana mash were added with most encouraging results. Addition of other fruit pulps is now under investigation. The general results have been so good as to be embarrassing to the staff of the seedling houses who have been hard put to handle the enlarged number of young seedlings coming forward for potting out.

84. The following orchid hybrids which flowered in 1957 were later named in 1958:

- 984, *Arachnoglottis* Brown Bars (*Arachnis* Maggie Oei  $\times$  *Trichoglottis fasciata*).
- 1472, *Arandanth* Starnoa (*Aranda* Gold Star  $\times$  *Vandanth* Ellen Noa).
- 977, *Arandanth* Chas. de Alwis (*Arachnis* Ishbel  $\times$  *Vandanth* Ellen Noa). Charles de Alwis, a Ceylon Burgher, was artist on the Gardens staff at the close of the last century and the beginning of this.
- 1319, *Arandanth* Grandeur (*Arachnis flos-aeris*  $\times$  *Vandanth* Ellen Noa).
- 1597, *Dendrobium* Paleface (*D.* Lim Chong Min  $\times$  *D. phalaenopsis* var. *Maunex Kea*).
- 1451, *Dendrobium* Concham (*D.* Constance  $\times$  *D.* Champagne).
- 1093, *Aranthera* Dainty (*Arachnis hookeriana* var. *luteola*  $\times$  *Renanthera monachica*).
- 1256, *Aranda* Marnie B. (*Arachnis hookeriana*  $\times$  *Vanda* Saphir). A cross made by Mr. A. J. Braga of Singapore and raised in the Botanic Gardens.
- 920, *Vanda* Hogil (*V.* Kapoho  $\times$  v. Gilbert Triboulet).

First flowerings in 1958 which were also named were:

- 2489, *Spathoglottis* Premier (*S.* Primrose var. Golden Flash  $\times$  *S.* Dr. Yeoh).
- 2398, *Spathoglottis* Golden Fleece (*S.* Primrose var. Golden Flash  $\times$  *S. aurea*).
- 857, *Holttumara* cochineal (*Aranda* Galistan var. Suntan  $\times$  *Renanthera coccinea*). This is the second trigeneric hybrid to be flowered in the Gardens. Generic name is in honour of Dr. R. E. Holttum, Director, 1925-1949, who initiated this work of orchid hybridising.
- 1723, *Dendrobium* Murray Henderson (*D.* Neo-hawaii  $\times$  *D.* Champagne). Named in honour of Mr. M. R. Henderson, Director 1949-1954. This hybrid has long arching sprays of peach coloured flowers.
- 1890, *Dendrobium* Harlequin (*D.* Tanglin  $\times$  *D.* Taurinum). An attractive hybrid with white sepals and violet lip and petals.
- 2223, *Vandanth* Candlelight (*Vanda* Cobber Cain  $\times$  *Euanthe sanderiana*). A cross made by Mr. M. Lewis of Singapore and raised in the Botanic Gardens.

Our own crossing of crosses made previously elsewhere which reached flowering in 1958 were: 1716 *D.* Louisae; 1125 *D.* Helen Adams; 2031 *D.* Liliha; 2056 *D.* Anita; 1888 *D.* Bali, and 2001 *D.* Syaj. Cross 2031 was made using *D.* Pauline  $\times$  *D. Phalaenopsis* var. *schraederianum*. There is a big variation in the siblings, but the best are free flowering with long-lasting long sprays of dark coloured flowers.



H. M. Burkill

#### PLANT HOUSE AND LILY POND—BOTANIC GARDENS

The central lawn is laid with a very fine strain of *Zoysia* sp. The Pergola (left) is made of trunks of tembusu (*Fagraea fragrans*), and cross-bearers for this and the raised portion are "tanalised" kempas (*Koompassia* sp.)



H. M. Burkill

#### FORMAL GARDEN—GOVERNMENT HOUSE DOMAIN



PITCHER PLANTS



*Nepenthes gracilis* Korth

G. H. Addison



*Nepenthes ampullaria* Jack

G. H. Addison

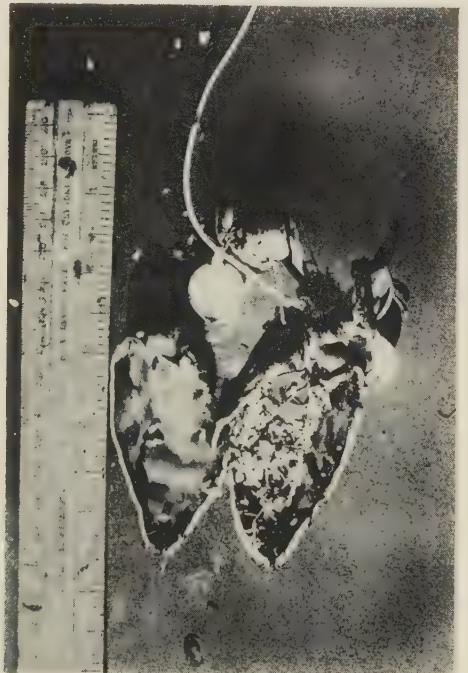


# PITCHER PLANTS



*Nepenthes rafflesiana* Jack an upper pitcher

G. H. Addison



H. M. Buckill

*Dischidia rafflesiana* Wall.—Quite different from *Nepenthes* spp., certain leaves are very deeply campanulate and are occupied by ants. The plant itself grows roots into the ants' nest. *Left*:—the climbing plant with normal and ant leaves. *Right*:—an ant leaf cut open showing ants, ant pupæ and plant roots



H. M. Barkal

#### LABRADOR NATURE RESERVE

Showing a portion of the cliff face vegetation. *Dipteris conjugata* Reinw., a montane fern in Malaya, is protected in this sea level Reserve



H. B. Gilliland

#### THE VANISHING VEGETATION

Primary forest in the process of being felled for estate planting. In portions of this area the dominant tree was found to be of a genus and species but newly described, *Kostermansia malayana*, Soegeng (1959). Thus does the axeman outpace the botanist



85. Other crosses as yet unnamed which flowered for the first time in 1958 were:

1475, *Dendrobium phalaenopsis* var. *compactum* × *D. phalaenopsis* var. *schroederianum*.

845, *Laelia xanthina* × *Cattleya warneri* var. *amasiana*.

1740, *Dendrobium* Pauline selfed.

779, *Dendrobium veratrifolium* × *D. Chye Siam*.

1260, *Vanda dearei* × *V. Gilbert Triboulet*.

2008, *Dendrobium* Neo-Hawaii × *D. Constance*.

1487, *Dendrobium* Caesar × *Dendrobium* Constance.

1420, *Aranda Ishbel* × *Vanda flos-aeris* var. *insignis*.

1624, *Dendrobium* Louisae × *D. Louis Bleriot*.

1400, *Vanda* Norbert Alphonso × *Vandanthe Rothschildiana*.

1525, *Vanda luzonica* × *V. Kapoho*.

86. In the latter part of 1958 the Malayan Orchid Society started a system of awards on much the same lines as that conducted by the Royal Horticultural Society of Great Britain. Plants raised in the Gardens which won awards were: *Award of Merit*—*Cypripedium millmanii* var. *Twinspray*, *Dendrobium* Gillian var. *Snowflake* and *Aranthera Dainty* var. *Prolific*; *Certificate of Cultural Commendation*—*Aranda Mauve Star* var. *Blue Ribbon*; *Certificate of Preliminary Commendation*—*Dendrobium* Murray Henderson var. *Peaches*, *Aranda Louise Wong* var. *Coffee King*, *Holttumara cochineal* var. *robust*. Gardens' hybrids raised outside which were awarded were: *Certificate of Cultural Commendation*—*Aranda Peter Ewart*, and *Certificate of Preliminary Commendation*—*Renantanda storiata*.

87. The Gardens are indebted to the following persons for valuable material supplies: Mr. Liao for 12 plants of *Phalaenopsis serpentilingua*; Dr. Soysa for 15 plants of *Vanda tessellata*; and Mr. McKillop of New Guinea for a consignment of 70 plants of native orchids which included species of *Dendrobium*, *Bulbophyllum*, *Cypripedium*, *Calanthes* and *Phaius*, and a very good plant of *Grammatophyllum papuanum*. These were exchanged for orchid seedlings and cuttings of our own hybrids. Exchanges were also made during the year with Messrs. P. Liao, A. Voon, Nam Kee, A. J. Braga, T.M.A. Ltd., McKillop, N. J. de Leon, Dr. Soysa and Mrs. Kornusut.

## XXIV. SUCCULENTS

88. The already large collection was expanded. In order to make room in the houses a number of specimens of the larger species such as *Alaës*, *Agaves* and *Cereus* was moved out into the open in November. These stood up to the rain without any apparent ill-effect. Some 150 plants were added to the display bedded out in a rockery in the plant house of Lawn L. This rockery is made of lumps of broken coral and coral chippings, and the plants quite obviously were thriving in this highly alkaline medium. Because of this, smaller species cultivated in pots were also tried with coral and 9-inch pans of 200 different species were top-dressed with coral chips. The initial success of this method of cultivation warrants its extension to the major part of our succulent collection.

## EXTENSION WORK

### XXV. TRAINEES

89. Three trainees were accepted from the Labour Department for instruction in gardening. They completed a course of six months. One trainee from the Shell Coy., Brunei undertook a four months course.



## XXVI. SALES

90. A total of 15,780 plants, cuttings, lots of bulbs and packets of seeds were sold to the public during the year. This is appreciably less than in 1957 when the total was 20,374, but the revenue derived from it was greater, \$4,241 against \$3,795. The sale of orchids decreased very greatly to 2,372 plants or cuttings at \$18,800 revenue from 4,852 plants or cuttings at \$28,209. The causes of this are varied. To some extent the trade recession must have limited ready money for the purchase of what is undoubtedly mainly a luxury, though obviously the limitation was not so severe as to curb purchase of the relatively inexpensive planting material of ordinary garden plants. Another factor is undoubtedly the flooding of the local market with orchid seedlings from Hawaii. Though the Assembly made provision in 1956 for the import of limited quantities of orchid material from hard currency sources (i.e. in effect from Hawaii) on the satisfaction of the Director of Botanic Gardens that such plants were required for use in breeding, not one application for endorsement of foreign currency control forms was made during the year. Singapore continued to be supplied *ad lib* through the back door via Hong Kong. In the latter part of the year currency regulations were relaxed with the result that more direct importation was possible. Another factor contributing to a decrease in revenue is that the Gardens had fewer seedlings available for sale to the public.

91. The Gardens continued to supply planting material free of charge to Singapore Government departments, charitable institutions, the University of Malaya and the Services. The Public Works Department took the biggest requisition of over 9,000 plants. It is worth recording one interesting purpose to which plants supplied from this Department were put. The Singapore School for the Blind was provided with a selection of succulents—some fiercely thorny, some prickly, some downy and some smooth and fleshy. Curiosity aroused, it was explained that the plants were required for teaching touch to blind children. Spartan schooling, this!

92. The sale of departmental publications, excluding what was sold through the Government Sales Bureau, was \$280.

## XXVII. EXHIBITION AND SHOWS

93. The Gardens participated in several shows during the year and won awards.

94. Some 200 plants including orchids, saintpaulias, cacti, succulents and begonias were put on display at the Malayan Agri-Horticultural Association exhibition in Kuala Lumpur 26-29th June. Mr. Alphonso and Mr. Wong Siew Hang staged the display and were on duty answering numerous queries and giving advice arising from the obvious public interest.

95. At the Singapore Gardening Society's annual show held at the Happy World Stadium 28th-30th March, Mr. A. G. Alphonso was Show Manager, and Mr. Burkill was on the show committee. Mr. G. H. Addison arranged a landscape of orchids, begonias and aroids. The Botanic Gardens does not show competitively at this show except for one item: the Best Orchid Hybrid raised in Singapore. In this competition it won with a fine plant of *Aranthera* Dainty, a hybrid of *Arachnis hookeriana* v. *luteola* × *Renanthera monachica*.

96. The second post-war orchid show of the Malayan Orchid Society held at the Happy World Stadium 5th-7th September was a great success. Several very fine plants not previously seen in this part of the world were exhibited. The Gardens put up an impressive display of orchids and foliage plants arranged by Mr. Juraimi bin Samsuri, Artist, as a formal garden. Mr. A. G. Alphonso was Show Manager and Mr. G. H. Addison and Mr. J. L. Pestana served on the show committee. At this show the Gardens won the competition for the Best Malayan Hybrid Flowering for the first time with Aranda Louise Wong. The pedigree of this hybrid is

*Arachnis flos-aeris* × *Arachnis hookeriana* v. *luteola*  
 |  
*Arachnis* Maggie Oei × *Vanda sumatrana*  
 |  
 Aranda Louise Wong.

97. The Gardens exhibited at the Malayan Orchid Society monthly shows and entered plants for the Society's awards. Details of successes are given in paragraph 98.

98. Orchid blooms were sent for exhibition at the *Daily Telegraph* Flower Show Festival, Harrogate, England where a Silver Medal was won; Spring Orchid Festival, Melbourne, Australia; Hastings Blossom Week, New Zealand; Asian Flower Show, Tokyo, Japan; Royal Horticultural Annual Show, Chelsea, England; North of England Horticultural Spring Show, and the Pakistan Flower Show, Karachi. Acknowledgement is due to Messrs. British Overseas Airways Corporation, Messrs. Qantas Airways and Messrs. Japan Airlines for flying these consignments without charge.

## XXVIII. SINGAPORE GARDENING SOCIETY

99. Mr. H. M. Burkill and Mr. A. G. Alphonso were committee members for the year 1957/58 ending in August. The former was elected president for the year 1958/59 and the latter remained on the committee. Mr. Wong Siew Hang joined the committee for the 1958/59 year. Mr. Wong also served on the Flower Show Committee for the 1958 Show and was Assistant Show Manager. A number of the Society's meetings were held at the Botanic Gardens where demonstrations and talks on different horticultural aspects were given by the staff. One meeting on vegetable growing was held at Government House Domain by kind permission of His Excellency the Governor.

## XXIX. MALAYAN ORCHID SOCIETY

100. Mr. G. H. Addison, Mr. A. G. Alphonso and Mr. J. L. Pestana served on the committee. Two meetings were held at the Botanic Gardens when talks and demonstrations were given by Mr. G. H. Addison. The Botanic Gardens orchids figured prominently at the Society's annual show (paragraph 96) and at the monthly meetings of the Society (paragraph 97). Mr. Addison was editor of the *Malayan Orchid Review* for the second half of 1958 and contributed articles and also numerous descriptions and photographs of new orchid hybrids.

## XXX. MALAYAN NATURE SOCIETY

101. Mr. Burkill served on the committee of the Society from January to March and in November and December. From April to October Mr. Addison was on the Committee.

## XXXI. MALAYAN AGRI-HORTICULTURAL SOCIETY

102. Mr. Burkill served on the committee of the Society from January to March and in December. Mr. Addison served from April to October. Participation by the Department in the Malayan Agri-Horticultural Society Show is referred to in paragraph 94.

## XXXII. ADVISORY WORK

103. With senior staff very much depleted, advisory work was reduced of necessity by as much as possible. Little more than routine assistance to the P.W.D. and other Government departments over planting plans and the supply of plants was possible. The Department advised in many small planting schemes, at the new Government clinics at Bukit Panjang and Pegu Road, at the Chief Justice's residence, Singapore Military Forces headquarters, Teachers' Training College, Government bungalows at Teluk Paku, at Flag-staff House and at the School for the Blind. Advice was also given to the Public Works Department for planting on new road roundabouts, sidetables and centre strips. The new Bukit Timah Road dual carriageway, bypassing Bukit Timah village, was planted with royal palms in the centre, and mixed broadleaved mahogany and *Eugenia grandis* on the sidetables. The royal palms were set at 15-foot spacing in a hedgerow planting so that their trunks would eventually make a headlamp glare break. A planting plan for the new Bukit Timah-Jurong link road was prepared but this awaited action at the end of the year. Plants proposed were again royal palms in a centre strip hedgerow planting with *Adinanthera*, *Acacia*, *Filicium* and broadleaved mahogany on the sidetables and roundabouts.

104. The herbarium staff was frequently consulted by local traders seeking information on English, Malay and other colloquial names of grains, pulses and condiments, and also to confirm identity and to check purity of samples.

105. In addition a large number of visitors called at the office seeking advice on all manner of subjects including several scarcely botanical or horticultural. Enquiries were also handled by correspondence which totalled 2,049 letters in and 1,820 out. Extensive use was made of the telephone by which also came appeals to remove bees nests from houses, cats from tree tops and provision of a measured mile for a walking race.



## APPENDIX I

## STAFF OF BOTANIC GARDENS, 1958

## DIVISIONS I-III

| <i>Appointment</i>                         | <i>Name</i>                                          | <i>Remarks</i>                                                         |
|--------------------------------------------|------------------------------------------------------|------------------------------------------------------------------------|
| Director .. ..                             | H. M. Burkill, M.A.<br>(Cantab.), F.L.S. ..          | On overseas leave 5th April to 2nd November.                           |
| Assistant Director ..                      | <i>Vacant</i>                                        |                                                                        |
| Keeper of the Herbarium                    | J. Sinclair, B.Sc.<br>(Edin.)                        |                                                                        |
| Botanist .. ..                             | Chew Wee Lek, B.Sc.<br>(Malaya) ..                   | On Fellowship at Cambridge University.                                 |
|                                            | C. X. Furtado, D.Sc.<br>(Bombay) ..                  | Re-engaged pensioner as training replacement <i>vice</i> Chew Wee Lek. |
| Curators .. ..                             | G. H. Addison ..                                     | Acting Director 5th April to 2nd November.                             |
|                                            | A. G. Alphonso                                       |                                                                        |
| Librarian .. ..                            | Tan Kim Ho, B.Sc.<br>(Malaya) ..                     | Appointed 1st April.                                                   |
| Laboratory Assistant<br>(Special Grade) .. | J. L. Pestana                                        |                                                                        |
| Executive Officer ..                       | <i>Vacant</i> .. ..                                  | Mr. F. A. Pereira, Higher Clerical Officer, officiating.               |
| Horticultural Assistant                    | Lam Hin Cheng ...                                    | On scholarship at Royal Botanic Gardens, Kew.                          |
| Herbarium and Museum Assistant ...         | Haji Mohamed Nur<br>bin Mohamed<br>Ghous, B.E.M. ... | Re-engaged pensioner; died 8th November.                               |
| <i>Vacant</i> ... ..                       | Mohamed Shah bin<br>Haji Md. Nur ...                 | Appointed 14th November.                                               |
| Artist ... ..                              | Juraimi bin Samsuri                                  |                                                                        |

## METEOROLOGICAL RECORDS

BOTANIC GARDENS, SINGAPORE 1958

Reading daily at 8 a.m. Local Time

*Orchid Enclosure*

| Month      | Total Rainfall<br>ins. | Highest Fall in 24<br>hours | No. of days<br>Rainfall | Mean Max.<br>Temp.<br>°F. | Highest Max.<br>Temp.<br>°F. | Mean Min.<br>Temp.<br>°F. | Lowest Min.<br>Temp.<br>°F. | Mean Dry Bulb<br>Temp.<br>°F. | Mean Wet Bulb<br>Temp.<br>°F. | Mean relative<br>humidity | Mean Min.<br>Grass Temp.<br>°F. | Mean Earth<br>Temp. 4"<br>°F. | Mean Earth<br>Temp. 1"<br>°F. | Mean Earth<br>Temp. 4"<br>°F. | Mean Daily hours<br>of sunshine<br>hours | °F.<br>Mean solar Rad.<br>Thermometer |
|------------|------------------------|-----------------------------|-------------------------|---------------------------|------------------------------|---------------------------|-----------------------------|-------------------------------|-------------------------------|---------------------------|---------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------------------|---------------------------------------|
| January    | 7.16                   | 1.64                        | 14                      | 84.9                      | 91.0                         | 72.9                      | 70.0                        | 75.3                          | 74.2                          | 97.3                      | 72.4                            | 80.2                          | 82.3                          | 82.9                          | 5.63                                     | 145.2                                 |
| February   | 5.27                   | 1.54                        | 13                      | 87.2                      | 90.0                         | 73.8                      | 68.0                        | 76.3                          | 75.6                          | 97.0                      | 73.4                            | 80.8                          | 83.3                          | 83.9                          | 4.75                                     | 142.1                                 |
| March      | 3.23                   | 1.45                        | 11                      | 88.7                      | 91.5                         | 73.9                      | 71.0                        | 76.7                          | 75.8                          | 96.4                      | 73.8                            | 82.7                          | 85.0                          | 85.0                          | 5.99                                     | 146.7                                 |
| April      | 3.87                   | 0.78                        | 13                      | 89.4                      | 91.5                         | 75.4                      | 72.5                        | 77.4                          | 76.7                          | 83.5                      | 74.8                            | 82.8                          | 85.3                          | 85.7                          | 5.94                                     | 137.8                                 |
| May        | 6.84                   | 1.82                        | 19                      | 87.5                      | 91.0                         | 75.5                      | 72.5                        | 78.0                          | 74.0                          | 96.3                      | 75.3                            | 81.8                          | 84.2                          | 85.1                          | 3.60                                     | 138.0                                 |
| June       | 7.51                   | 1.97                        | 14                      | 87.3                      | 91.5                         | 75.5                      | 71.0                        | 77.6                          | 76.8                          | 97.0                      | 74.5                            | 81.1                          | 83.4                          | 84.7                          | 4.29                                     | 139.2                                 |
| July       | 1.35                   | 0.46                        | 8                       | 88.3                      | 91.5                         | 74.8                      | 71.5                        | 77.3                          | 76.7                          | 97.5                      | 73.2                            | 81.4                          | 83.8                          | 84.4                          | 5.67                                     | 140.2                                 |
| August     | 11.70                  | 1.96                        | 17                      | 87.0                      | 93.0                         | 73.6                      | 71.5                        | 76.2                          | 75.4                          | 97.0                      | 73.3                            | 80.7                          | 82.6                          | 83.8                          | 3.60                                     |                                       |
| September  | 2.51                   | 0.71                        | 14                      | 87.4                      | 90.0                         | 74.6                      | 72.5                        | 77.6                          | 76.8                          | 96.7                      | 74.0                            | 81.6                          | 84.5                          | 84.5                          | 5.06                                     |                                       |
| October    | 10.93                  | 3.56                        | 18                      | 87.3                      | 91.5                         | 74.1                      | 71.8                        | 76.9                          | 75.8                          | 95.3                      | 73.3                            | 81.4                          | 84.5                          | 84.9                          | 4.90                                     |                                       |
| November   | 21.85                  | 5.60                        | 20                      | 86.5                      | 92.0                         | 73.5                      | 69.0                        | 76.2                          | 75.3                          | 95.7                      | 73.1                            | 80.0                          | 82.5                          | 83.4                          | 3.71                                     |                                       |
| December   | 5.17                   | 1.32                        | 13                      | 87.1                      | 92.5                         | 72.7                      | 71.0                        | 75.3                          | 74.2                          | 95.0                      | 71.8                            | 79.5                          | 82.4                          | 82.5                          | 4.83                                     |                                       |
| Total/Mean | 87.39                  | ..                          | 174                     | 87.4                      | 90.6                         | 74.2                      | 71.0                        | 77.3                          | 75.5                          | 95.4                      | 73.6                            | 81.2                          | 83.6                          | 84.2                          | 4.83                                     | 141.2                                 |

# APPENDIX III

## METEOROLOGICAL RECORDS

BOTANIC GARDENS, SINGAPORE, 1958

Reading daily at 0200 hours G.M.T. = 9.30 a.m. Local Time

*Gardens Office*

| Month      | Total rainfall<br>ins. | Highest<br>fall in<br>24 hours<br>ins. | No. of<br>days<br>rainfall | Mean<br>Max.<br>Temp.<br>°F | Highest<br>Max.<br>Temp.<br>°F | Mean<br>Min.<br>Temp.<br>°F | Lowest<br>Min.<br>Temp.<br>°F | Mean<br>Temp.<br>Dry Bulb<br>°F | Mean<br>Temp.<br>Wet Bulb<br>°F | Mean<br>Relative<br>Humidity<br>% |
|------------|------------------------|----------------------------------------|----------------------------|-----------------------------|--------------------------------|-----------------------------|-------------------------------|---------------------------------|---------------------------------|-----------------------------------|
| January    | 7.79<br>(11.40)        | 1.61                                   | 15                         | 85.0                        | 91.5                           | 73.9                        | 70.0                          | 80.5                            | 76.2                            | 81.9                              |
| February   | 5.68<br>(7.35)         | 1.57                                   | 15                         | 87.8                        | 91.0                           | 75.3                        | 71.0                          | 78.0                            | 76.8                            | 83.5                              |
| March      | 3.68<br>(8.41)         | 1.54                                   | 11                         | 87.7                        | 92.5                           | 75.4                        | 72.0                          | 82.0                            | 77.3                            | 80.9                              |
| April      | 3.45<br>(8.11)         | 0.92                                   | 14                         | 90.8                        | 92.8                           | 76.2                        | 72.5                          | 84.0                            | 78.6                            | 77.8                              |
| May        | 7.44<br>(7.48)         | 1.84                                   | 19                         | 89.0                        | 93.0                           | 76.3                        | 73.0                          | 81.8                            | 76.2                            | 85.7                              |
| June       | 11.90<br>(6.39)        | 2.55                                   | 15                         | 88.7                        | 92.5                           | 76.3                        | 71.0                          | 81.8                            | 78.3                            | 85.4                              |
| July       | 2.09<br>(6.20)         | 0.83                                   | 9                          | 90.4                        | 93.0                           | 76.0                        | 71.0                          | 82.0                            | 78.6                            | 85.9                              |
| August     | 12.81<br>(7.44)        | 2.10                                   | 19                         | 86.6                        | 91.0                           | 74.3                        | 72.0                          | 79.3                            | 76.8                            | 89.1                              |
| September  | 3.18<br>(8.18)         | 1.35                                   | 13                         | 88.5                        | 91.5                           | 76.0                        | 73.0                          | 83.0                            | 78.0                            | 82.7                              |
| October    | 12.73<br>(7.88)        | 1.78                                   | 19                         | 88.0                        | 92.0                           | 75.4                        | 71.8                          | 81.2                            | 78.0                            | 86.7                              |
| November   | 21.56<br>(10.64)       | 5.24                                   | 19                         | 86.8                        | 91.5                           | 74.8                        | 71.5                          | 80.4                            | 77.2                            | 84.4                              |
| December   | 4.32<br>(12.75)        | 1.36                                   | 13                         | 87.2                        | 89.5                           | 73.8                        | 71.5                          | 80.4                            | 76.2                            | 82.2                              |
| Total/Mean | 96.63 (97.22)          | ..                                     | 181                        | 88.0                        | 91.8                           | 75.3                        | 71.7                          | 81.2                            | 77.3                            | 83.7                              |

\*Mean for 1914-58.



## SUMMARY OF DISTRIBUTION OF EXCHANGES AND LOANS

| Distribution             | EXCHANGE         |          | LOANS            |       |
|--------------------------|------------------|----------|------------------|-------|
|                          | No. OF SPECIMENS |          | No. OF SPECIMENS |       |
|                          | Given            | Received | Out              | In    |
| 1. Kew .. ..             | 1,365            | ..       | 624              | 25    |
| 2. Leiden .. ..          | 1,333            | 513      | 1,496            | 689   |
| 3. Arnold Arboretum ..   | 889              | ..       | ..               | ..    |
| 4. Bogor .. ..           | 349              | 1,945    | 88               | ..    |
| 5. Manila .. ..          | 286              | 175      | ..               | ..    |
| 6. Bangkok .. ..         | 618              | ..       | ..               | ..    |
| 7. Lae (New Guinea) ..   | 365              | 101      | ..               | ..    |
| 8. Dehra Dun .. ..       | 69               | 354      | ..               | ..    |
| 9. British Museum .. ..  | 173              | ..       | ..               | ..    |
| 10. Edinburgh .. ..      | 449              | ..       | 17               | ..    |
| 11. Berlin .. ..         | 196              | ..       | ..               | ..    |
| 12. Cambridge .. ..      | 197              | ..       | ..               | ..    |
| 13. Tokyo .. ..          | 20               | 141      | 530              | ..    |
| 14. New York .. ..       | 39               | ..       | 99               | ..    |
| 15. Lucknow .. ..        | 64               | ..       | ..               | ..    |
| 16. Sandakan .. ..       | 304              | 116      | ..               | ..    |
| 17. Sarawak .. ..        | ..               | 1,064    | ..               | 5     |
| 18. Brunei .. ..         | ..               | 1,329    | ..               | ..    |
| 19. Kepong .. ..         | 136              | 10       | ..               | ..    |
| 20. Bailey Hortorium ..  | 24               | ..       | ..               | ..    |
| 21. Munich .. ..         | 141              | ..       | ..               | ..    |
| 22. Canberra .. ..       | ..               | ..       | ..               | 259   |
| 23. Brussels .. ..       | ..               | 127      | ..               | ..    |
| 24. Florence .. ..       | ..               | ..       | ..               | 18    |
| 25. Upsala .. ..         | 11               | ..       | ..               | ..    |
| 26. Illinois (U.S.A.) .. | 15               | ..       | 17               | ..    |
| 27. Mexico .. ..         | ..               | 2        | ..               | ..    |
| 28. Sydney .. ..         | ..               | ..       | ..               | 203   |
| 29. Geneva .. ..         | ..               | ..       | 15               | ..    |
| 30. Gronigen .. ..       | 34               | ..       | ..               | ..    |
| 31. Washington .. ..     | 5                | ..       | ..               | ..    |
| 32. Michigan .. ..       | 47               | ..       | ..               | ..    |
| Total ..                 | 7,129            | 5,877    | 2,886            | 1,199 |

INSTITUTIONS AND PRIVATE COLLECTORS FROM WHOM PLANTS AND SEEDS  
WERE RECEIVED IN 1958

|                             |    |                                                                                                                                                                                                                               |
|-----------------------------|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Australia ..                | .. | The Parks Department, Brisbane; The Botanic Gardens, Brisbane; The Government Botanist, South Yarra, Victoria; The Botanic Gardens, Canberra.                                                                                 |
| Bahamas ..                  | .. | A. C. Langlois, Nassau.                                                                                                                                                                                                       |
| Belgium ..                  | .. | City Botanic Gardens, Louvain, Botanic Gardens, Antwerp.                                                                                                                                                                      |
| Bermuda ..                  | .. | Department of Agriculture.                                                                                                                                                                                                    |
| Ceylon ..                   | .. | Dr. E. Soysa, Colombo.                                                                                                                                                                                                        |
| Czechoslovakia ..           | .. | Institutum Naturae-Sciencum, Prague.                                                                                                                                                                                          |
| Denmark ..                  | .. | University Botanic Gardens, Copenhagen.                                                                                                                                                                                       |
| Federation of Malaya ..     | .. | Botanic Gardens, Penang; Mr. Chew Tze Foong, Kuala Lumpur.                                                                                                                                                                    |
| France ..                   | .. | Botanic Gardens of the Faculty of Sciences, Besancon and of Strasbourg.                                                                                                                                                       |
| Germany ..                  | .. | Botanic Gardens:—Munich; Cologne; Gottingen University; Berlin; Friedrich Schiller University, Jena; Essen; Halle; Frankfurt (Palmengarten); Johannes Gutenberg University, Mainz; Darmstaadt, M/s. Robert Blossfeld, Lubeck. |
| Ghana ..                    | .. | University College, Achimota.                                                                                                                                                                                                 |
| Hawaii ..                   | .. | Foster Botanic Gardens, Honolulu.                                                                                                                                                                                             |
| Holland ..                  | .. | Botanic Gardens, Leiden.                                                                                                                                                                                                      |
| Hongkong ..                 | .. | City Parks Department, Mr. Peter Tsang, Kowloon.                                                                                                                                                                              |
| Hungary ..                  | .. | University Botanic Gardens, Szeged; M.T.A. Botanikai Kutató Intezete, Vacratot; Botanic Gardens, University of Budapest.                                                                                                      |
| India ..                    | .. | Forest Research Institute, Dehra Dun.                                                                                                                                                                                         |
| Indonesia ..                | .. | Dr. Meijer, Sumatra.                                                                                                                                                                                                          |
| Italy ..                    | .. | Botanic Gardens of the Universities of Catania, Sicily and Modena.                                                                                                                                                            |
| Japan ..                    | .. | University Botanic Gardens, Osaka; Mr. T. Satake, Hiroshima-ken; Mr. Shigeo Kurata, Tokyo; Botanic Gardens, Osaka; H. Suenaga, Kagoshima; Yosihumi Oka, Matsuzaka.                                                            |
| Kenya ..                    | .. | Parks Department; Nairobi.                                                                                                                                                                                                    |
| New Guinea ..               | .. | Mr. F. R. McKillop, Rabaul; Forest Department, Lae.                                                                                                                                                                           |
| New Zealand ..              | .. | Anderson & Son Ltd., Napier.                                                                                                                                                                                                  |
| Poland ..                   | .. | Institutum Plantarum Medicinalium, Poznan.                                                                                                                                                                                    |
| Portugal ..                 | .. | Botany Department of the University of Lisbon.                                                                                                                                                                                |
| Siam ..                     | .. | Mrs. Karnusut, Bangkok.                                                                                                                                                                                                       |
| Singapore ..                | .. | Singapore Gardening Society; Mr. Philip Liao, Nam Kee Nursery, Department of Botany, University of Malaya; Mr. Tan Chye Siam, Mr. Loke Wan Tho; Messrs. T. M. A. Ltd., City Council Nursery; The Hon. Mr. A. J. Braga.        |
| South Africa ..             | .. | Department of Botany, University of Pretoria.                                                                                                                                                                                 |
| Sweden ..                   | .. | Botanic Gardens of the University, Upsala.                                                                                                                                                                                    |
| Switzerland ..              | .. | Botanic Gardens of the University of Basle.                                                                                                                                                                                   |
| Uganda ..                   | .. | Botanic Gardens, Entebbe.                                                                                                                                                                                                     |
| United Kingdom ..           | .. | Royal Botanic Garden, Edinburgh; Botanical Supply Unit, University of London; University Botanic Garden, St. Andrews; Carters Ltd., London, The Botanic Gardens, Glasgow.                                                     |
| United States of America .. | .. | N. J. de Leon, Miami; E. A. Menninger, Stuart Florida; U. S. Plant Introduction Gardens, Florida; D. Barry, Los Angeles; Botanical Gardens, University of California; R. H. Gast, Los Angeles.                                |
| Venezuela ..                | .. | Dr. Leon Croizat, Caracas.                                                                                                                                                                                                    |
| Yugoslavia ..               | .. | Botanic Gardens, Zagreb.                                                                                                                                                                                                      |

## APPENDIX VI

INSTITUTIONS AND PRIVATE COLLECTORS TO WHOM PLANTS AND SEEDS  
WERE SENT IN 1958

|                         |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Australia ..            | .. | Mrs. D. Wright, Queensland; Mrs. W. N. Cobley, West Australia.                                                                                                                                                                                                                                                                                                                                                                                       |
| Bahamas ..              | .. | Mr. A. Langlois, Nassau.                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Bermuda ..              | .. | Department of Agriculture.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Brazil ..               | .. | Jardin Botanico, Rio de Janeiro; Hortus Botanico, Para; Instituto de Treinamento-Agronomico, Monte D'Este Lampinas.                                                                                                                                                                                                                                                                                                                                  |
| Czechoslovakia ..       | .. | Kaul Zartos, Flostovince, Krasna Flora, Mad/Vltavon; Institute of Yang-Natural Philosopherin Pragneg Vysocany; Botanic Gardens of Academy of Science, Kosice; Davidik Vaclav, Krasna Flora, Mad/Vltavon; Monsieur de Directeur, Moravska-Museum V Brne, Brno.                                                                                                                                                                                        |
| Denmark ..              | .. | The Zoological Museum of the University of Copenhagen.                                                                                                                                                                                                                                                                                                                                                                                               |
| Egypt ..                | .. | Mr. A. Birch, Middle Egypt Botanic Station, El-Saft.                                                                                                                                                                                                                                                                                                                                                                                                 |
| Federation of Malaya .. | .. | Forest Department, Kuala Lumpur; Conservator of Forest, Johore Department of Agriculture, Kuala Lumpur.                                                                                                                                                                                                                                                                                                                                              |
| Fiji ..                 | .. | Major Willoughby-Tottenham, Suva; The Conservator of Forest Department of Forestry, Suva.                                                                                                                                                                                                                                                                                                                                                            |
| Finland ..              | .. | Botanic Gardens of the University of Turku.                                                                                                                                                                                                                                                                                                                                                                                                          |
| Formosa ..              | .. | Botanic Gardens, Taipeh, Taiwan.                                                                                                                                                                                                                                                                                                                                                                                                                     |
| France ..               | .. | Office of the Mayor of Lille; Director, Botaniques La Leonina-Station Expt., La Beaulieu S/Mer (A.M.).                                                                                                                                                                                                                                                                                                                                               |
| Germany ..              | .. | Arznaipflanzen Kulturen, veb. Homoopfarm, Leipzig 05; Bernadus Vien Saase, Aalen/Wurtttemberg; Curator Herbarium, Botanischer-Gartens, Hamburg 36.                                                                                                                                                                                                                                                                                                   |
| Ghana ..                | .. | College of Technology, Kumasi; Department of Agriculture.                                                                                                                                                                                                                                                                                                                                                                                            |
| Hawaii ..               | .. | Makiki Nursery, Honolulu.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Holland ..              | .. | Hortus Botanicus, Leiden.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Hungary ..              | .. | Botanikai Kutata Intezete, Vacratot.                                                                                                                                                                                                                                                                                                                                                                                                                 |
| India ..                | .. | Botany Branch, Forest Research Institute, Dehra Dun; The Horticulturist, Department of Agriculture, Hyderabad; S. Hedayatullah, Bungalow No. 4, Agriculture Farm, P.O. Tejaon, Dacca; The Director, National Botanical Gardens, Lucknow; A. Percy Lancaster, Directorate of Horticulture, Central P.W.D., New Delhi.                                                                                                                                 |
| Iraq ..                 | .. | Dr. Matti Al-Aish, Department of Botany, Baghdad.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Italy ..                | .. | Mr. C. Sherrill, Taorenina, Sicily.                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Japan ..                | .. | Mr. T. Satake, Satake Engineering Co., Ltd., Tokyo; The Botanical Garden of Osaka City University; S. Kurata, 22015 Motoki-cho, Adachi-ku, Tokyo; Kasutabe Expt. Station of Medicinal Plants, Kasutabe-shi, Saitawaken; V. Segawa, Kosobe, Osaka Prefecture; Izu Experimental Station of Medicinal Plants, Shizouken; Mr. Yosihumi Oka, 1877 Nakamachi Matsuzaka, Mie; Onomichi Botanical Gardens, Hiroshima-ken; Miyakejima Weather Station, Tokyo. |
| Jamaica ..              | .. | Mr. V. James, Royal Botanic Gardens, Kingston.                                                                                                                                                                                                                                                                                                                                                                                                       |
| Kenya ..                | .. | Mr. H. P. Greensmith, Parks Superintendent, City Hall, Nairobi.                                                                                                                                                                                                                                                                                                                                                                                      |
| Marianna Islands ..     | .. | Director of Agriculture, Trust Territory of the Pacific, Agama, Guam.                                                                                                                                                                                                                                                                                                                                                                                |
| Mexico ..               | .. | Senor Carlos Prieto, Balderas 68 Mexico D.F.; Boone Hallberg, Domicilio Conocido, Ville Atla, Oaxca.                                                                                                                                                                                                                                                                                                                                                 |
| New Guinea ..           | .. | F. R. McKillop, Arawa Plantation, Rabaul; R. E. D. Dwyer, Department of Agriculture, Stock and Fisheries, Port Moresby; P. Bateson, Education Department, Port Moresby.                                                                                                                                                                                                                                                                              |



|                                 |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>New Zealand</b>              | .. | J. N. Anderson & Son, Ltd., Plant Growers—Nurserymen, Napier; Director Parks and Reserve, Parks Department, City of Auckland; W. L. Home-Morrison, 127 Pt. England Road, Auckland; Mr. Gray Jamieson, 89 Latham St. Napier.                                                                                                                                                                                                                                                                                    |
| <b>Nigeria</b>                  | .. | College of Technology, Nigeria.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>North Borneo</b>             | .. | Conservator of Forests, Sandakan.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Puerto Rico</b>              | .. | Agronomist, Federal Expt. Station, Puerto Rico.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>South Africa</b>             | .. | Dr. P. R. Enslin, N.C.R.L., Box 395, Pretoria; The University of Pretoria.                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Switzerland</b>              | .. | Samin-Manser, P.O. Box Zurich 22.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Thailand</b>                 | .. | V. Jirawongse, School of Pharmacy, Bangkok.                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Trinidad</b>                 | .. | Imperial College of Tropical Agriculture.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>United Kingdom</b>           | .. | The Curator, Glasgow Botanic Gardens, Glasgow; Major V. F. Howell, Cobham, Surrey; E. J. H. Corner, Botany School, Cambridge; The Director, Royal Botanic Gardens, Kew, Surrey.                                                                                                                                                                                                                                                                                                                                |
| <b>United States of America</b> | .. | Mr. Barry, California Jungle Gardens, Los Angeles, California; David S. Fox, Little Rock, Arkansas; Mr. L. C. Knorr, Citrus-Experimental Station, University of Florida; Plant Introduction Section, U. S. Department of Agriculture, Beltsville, Maryland; Mr. Edwin Menninger, Stuart, Florida; Mr. Harrison Yocum, The University of Tennessee, Tennessee; Albert Roller, California Evergreen Nurseries, San Francisco; Department of Botany, University of North Carolina; N. J. de Leon, Miami, Florida. |
| <b>Vietnam</b>                  | .. | Huyul Van-Tung, Jardin Botanique, Saigon.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Venezuela</b>                | .. | Dr. Leon Croizat, Caracas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Yugoslavia</b>               | .. | Hortus Botanicus, Zagreb.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

## COLONY OF SINGAPORE GOVERNMENT GAZETTE

Supplement No. 52, Friday, August 15, 1958.

No. S 182—THE BOTANIC GARDENS ORDINANCE, 1957.  
(No. 32 OF 1957).

## THE BOTANIC GARDENS RULES 1958.

In exercise of the powers conferred by subsection (1) of section 4 of the Botanic Gardens Ordinance, 1957, the Chief Secretary hereby makes the following Rules:—

Short title.

1. These Rules may be cited as the Botanic Gardens Rules, 1958.

Definition.

2. In these Rules "vehicle" means any vehicle whether mechanically propelled or otherwise.

Hours of opening.

3. The Gardens shall be open daily from 6 a.m. to 7 p.m.: Provided that the Director may open or close the Gardens or part thereof at any other times as he deems fit.

Restriction of entry into and use of Gardens by vehicles.

4.—(1) No vehicle other than private motorcars and bicycles shall be admitted into the Gardens except with the permission of the Director.

(2) No vehicle shall enter the Gardens except by the authorised gate or gates.

(3) No vehicle shall be driven or ridden within the Gardens except on such roads as are indicated by traffic or other signs to be open for use by vehicles and at a speed not greater than fifteen miles per hour:

Provided that invalid chairs and perambulators may be permitted to be used on any other road or footpath in any part of the Gardens open to the public.

(4) No vehicle shall be parked in the Gardens except on the left hand side of the roads open to vehicular traffic and in accordance with the parking signs provided therefor.

Admission.

5. No person shall enter the Gardens except by the authorized gate or gates or remain in the Gardens except during the hours when the Gardens are open.

Protection of flora.

6. No person in the Gardens shall without the authority or written permission to the Director—

(a) climb any tree or bush;

(b) remove or injure any plant or part thereof;

(c) pick flowers;

(d) take any seed or cuttings;

(e) trample on any flower bed; or

(f) do any other act which causes injury to the flora.

Protection of fauna.

7. No person in the Gardens shall without the authority or written permission of the Director—

(a) fish in the lakes, ponds or streams;

(b) kill, hunt, shoot or trap any animal;

(c) collect any bird's egg or nest; or

(d) do any act which causes injury to the fauna.

Other prohibitions and restrictions on use of Gardens.

8. No person in the Gardens shall without the authority or written permission of the Director—

(a) bathe in the lakes, ponds, streams or water tanks;

(b) kindle any fire;

(c) expose for sale or sell any merchandise, food or drink;

(d) ply for hire, solicit, gamble or assist in gambling;

(e) have with him any animal, except a dog which shall be under proper control and on a lead;

(f) release any animal;

(g) throw or discharge any stone or missile;

(h) throw or deposit any filth, rubbish or refuse;

(i) throw or deposit any litter otherwise than in the receptacles provided therefor;

- (j) discharge any fireworks, crackers, firearm or weapon;
- (k) play any ball or team games;
- (l) play any musical instrument or use any apparatus for the reproduction of sound by means of a loudspeaker;
- (m) remove, damage, displace, deface or make improper use of any seat, shelter, structure, notice, label, appliance or utensil;
- (n) affix or post any bill, placard, notice or advertisement to any wall, tree, fence or structure;
- (o) erect or assemble any tent, booth, table or other structure;
- (p) expectorate, use any indecent or offensive language, behave in an indecent or offensive manner or obstruct, disturb or annoy any other person in the proper use of the Gardens or loiter or obstruct any officer of the Gardens in the execution of his duty; or
- (q) preach or deliver any public address or assemble for the purpose of holding or taking part in any religious or political meeting.

9. Any person who behaves in a disorderly or improper manner or contravenes the provisions of any of these Rules may be ordered out of the Gardens and be refused admission thereto subsequently by a police officer or an officer of the Gardens. Contravention of Rules.

10. Any person who contravenes the provisions of rule 4, 5, 6, 7 or 8 of these Rules shall be guilty of an offence and shall on conviction be liable to a fine not exceeding one thousand dollars. Penalty.

Made this 15th day of August, 1958.

E. B. DAVID,  
*Chief Secretary,*  
*Colony of Singapore.*

[No. 14052/50].













